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10/556,355	11/10/2005	Hachishiro Iizuka	281154US26PCT	6745
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OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			EXAMINER CHEN, KEATH T	
			ART UNIT 1792	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<i>Office Action Summary</i>	Application No.	Applicant(s)	
	10/556,355	IIZUKA, HACHISHIRO	
	Examiner	Art Unit	
	KEATH T. CHEN	1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 January 2009.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4,8-19,22,23,25-27,34,35 and 38-45 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4,8-19,22,23,25-27,34,35 and 38-45 is/are rejected.
- 7) ☒ Claim(s) 41 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 01/02/2009 has been entered.

Response to Amendment

1. The claim amendment filed on 01/02/2009, addressing rejection of claims 1-4, 6, and 8-37 from the supplemental final office action (07/01/2008) by amending claims 1-2, 8, 12-17, 22, 26, and 34-35; canceling claims 6, 20-21, 24, 28-33 and 36-37; and adding new claims 38-45 is entered, and will be addressed below.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1-4, 8-19, 22-22, 25-27, 34-35, and 38-45 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the

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inventor(s), at the time the application was filed, had possession of the claimed invention.

Claims 1 and 17 recite the limitations of "a delivery part ... deliver a gas material generated inside the vaporizing chamber to a gas source material supply line", whereas the gas source material supply line, such as 121 in Fig. 1, is described as the supplying source or liquid material to the vaporizing chamber. There is no description of recycling the gas generated back to the vaporizing chamber.

The examiner assumes Applicant meant to describe a different gas material supply from vaporizer to the processing chamber; or "a gas material generated inside the vaporizing chamber from a gas source material supply line". Claims 1 and 17 will be examined accordingly.

Claim 41 recites "the shield plate receives heat through the heat transfer member and the spacer to from the second heating portion". However, spacer (136, 156, 166, or 186) is heat transfer member. There is no description of spacer that is different from the heat transfer member.

Claim Rejections - 35 USC § 102

The text of those sections of Title 35 U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1-3, 16, 25, and 38 are rejected under 35 U.S.C. 102(b) as being anticipated by Naoki et al. (US 6074487, hereafter '487).

'487 teaches all limitations of:

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Claim 1: A vaporizer (Fig. 13, #206) comprising: a vaporizing chamber (S1, col. 10, line 49) including a vaporizing surface (the inner wall surface of chamber S1) configured to vaporize a liquid material (M); a spray portion (#205, col. 11, lines 8-10) configured to spray the liquid material in the vaporizing chamber; a delivery part (including #220 and #216, everything outside of chamber S1 is for delivery, including walls outside S1 but inside of #201) attached to the vaporizing chamber (including #220 and #216, everything outside of chamber S1 is attached to S1) and including a gas outlet (discharging pipe #220, col. 9, line 56) to deliver a gas material (M+X) generated inside the vaporizing chamber to a source material supply line (gas from #220 is to supply to the CVD processing unit, col. 9, lines 56-60; or is from a liquid source M through #214); a first heating portion (side heater #217, col. 10, line 25, as it heats #216) configured to heat the vaporizing chamber (S1) and a second heating portion (#215, for example) configured to heat a wall of the delivery part (#215 is heating walls outside S1 but inside of #201), wherein the delivery part comprises a filter member (#216, porous heating element function as filter, col. 10, lines 55-57) covering the gas outlet (#220) and including a peripheral portion (the bottom of the hat shaped #216 is peripheral) set in thermal contact with and fixed to the wall of the delivery part (the bottom of #216 is fixed to the wall of the delivery part, specifically, the unlabeled bottom wall above the inner o-ring), and a heat transfer member (the not labeled columns between #218 and #203) set in thermal contact with the filter member at a position other than a peripheral portion (these columns are between #216 and upper #215 at position other than a peripheral portion/bottom portion of #216) and configured to transfer heat

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of the second heating portion (#215) to the filter member (#216, porous heating element function as filter, col. 10, lines 55-57), wherein the second heating portion (#215) and the filter member (#216, porous heating element function as filter, col. 10, lines 55-57) are separated from each other (as shown in Fig. 13), and the heat transfer member (the not labeled columns between 218 and 203) is disposed between the second heating portion (#215) and the filter member (#216, porous heating element function as filter, col. 10, lines 55-57) and supports the filter member (these columns supports #216, as shown in Fig. 13).

Claim 2: A control member (#608, col. 14, lines 18-20) configured to control temperature of the second heating portion (#215) based on temperature of the heat transfer member (the not labeled columns between 218 and 203) or the filter member (#216, porous heating element function as filter, col. 10, lines 55-57) (thermal coupler #221 connected to the filter, col. 10, lines 35-37).

Claim 3: The heat transfer member (the not labeled columns between 218 and 203) comprises a plurality of heat transfer members (the not labeled columns between 218 and 203).

Claims 25: An apparatus (Fig. 1) for performing a semiconductor process on a target substrate, the apparatus comprising: a process chamber (#1, col. 6, lines 58-66) configured to accommodate the target substrate; and a gas supply system (#12, Fig. 13 is one embodiment of #12, see drawing description) configured to supply a process gas into the process chamber, wherein the gas supply system comprises the vaporizer according to claim 1.

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Claim 38: The vaporizer according to claim 1, wherein the heat transfer member comprises columns (the not labeled columns between #218 and #203) disposed on the wall of the delivery part (#203 is wall of the delivery part).

Claim 16: The vaporizer according to claim 38, wherein the heating portion comprises a heater embedded in a wall of the vaporizing chamber (#215 is embedded in the wall).

4. Claims 17, 27, and 44 are rejected under 35 U.S.C. 102(b) as being anticipated by Affinito (US 6207239, hereafter '239).

'239 teaches all limitations of:

Claim 17: A vaporizer (Flash evaporator, Fig. 2, #106, col. 4, line 23) comprising: a vaporizing chamber (housing #116, col. 4, line 24) including a vaporizing surface (the inner surfaces of #116, particularly surface #124, col. 2, lines 26) configured to vaporize a liquid material (monomer droplet, col. 4, lines 27-28); a spray portion (atomizing nozzle #120, col. 4, lines 24-25) configured to spray the liquid material (monomer, col. 4, line 24) in the vaporizing chamber; a delivery part (baffles #126 and outlet #128, col. 4, lines 28-29) including a gas outlet (#128) to deliver a gas material generated inside the vaporizing chamber to a source material supply line (discharge housing #200, col. 4, line 41); and a heating portion (#124, heated surface, col. 4, line 26) configured to heat the vaporizer, wherein the delivery part comprises a plate member (the baffle #126 on the left) covering the gas outlet (#128) and a wall (the vertical wall around #128 and right hand side of #116) around the gas outlet, with a gap therebetween to form a communication clearance (a gap between the left #126 and the top center of #116),

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such that a gas passage connecting the vaporizing chamber to the gas outlet is formed between the plate member (left #126) and the wall (the zigzag conduit formed by #126 and the right half of #116), a heater (#124 also supplies heat to the zigzag conduit through heat conduction) configured to heat the gas material flowing through the gas passage, a plurality of columns (the other baffles #126) disposed and distributed in the gas passage (is in the gas passage) to serve as a fluid baffle and set in thermal contact with the wall (all #126 are in thermal contact with the right half wall of #116) to transfer heat from the heater (the upper #124), wherein the plurality of columns are disposed to prevent the gas material, which flows toward the gas outlet (#128), from directly reaching the gas outlet while traveling in a straight path from the communication clearance (the gap for left #126 and the top center wall of #116 can not directly reach #128).

Claim 27: An apparatus (Fig. 2) for performing a semiconductor process on a target substrate (#104, col. 4, line 47), the apparatus comprising: a process chamber (not shown, col. 4, lines 19-22) configured to accommodate the target substrate; and a gas supply system (#106, flash evaporator) configured to supply a process gas into the process chamber, wherein the gas supply system comprises the vaporizer according to claim 17.

Claim 44: The vaporizer according to claim 17, wherein the plurality of columns are arrayed in a staggered pattern (the rest of #126 is staggered, Fig. 2).

Claim Rejections - 35 USC § 103

The text of those sections of Title 35 U.S. Code not included in this action can be found in a prior Office action.

5. Claim 4, 8-10, 12-15, 26, 34-35, 39-40, and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over '487, further in view of Sun et al. (US 6409839, hereafter '839).

'487 teaches all limitations of claim 1, as discussed above.

'487 does not teach the limitations of:

Claim 4: The vaporizer according to claim 1, further comprising a heater incorporated in the heat transfer member.

Claim 35: the vaporizer according to claim 1, further comprising a shield plate covering the filter member and disposed farther from the gas outlet than is disposed the filter member.

'839 is an analogous art in the field of vaporizer for CVD (col. 1, lines 17-35), particularly in solving the problem of clogging (col. 2, lines 17-22 and col. 3, line 35). '839 teaches heated filter, heated flow restriction, etc, (Fig. 9, for claim 4); a shield plate (#150) to provide vaporization surface before the filter (for claim 35).

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have combined '839 with '487. Specifically, to have added

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heater to the various components, particularly the columns/heat transfer member in the flow passage and to add a heated block before the filter, for the purpose/motivation to avoid clogging, as taught by '839 (col. 3, line 35).

'839 further teaches the limitations of:

Claim 34: The vaporizer according to claim 35, wherein the shield plate (block #150 and heater #158, together, is a thick plate with bores #152, col. 10, lines 5-8 and line 11) is interposed between the vaporizing chamber (inlet chamber #154, not labeled, col. 10, line 8, the space above #150) and the filter member (#160, col. 10, lines 16-17) to prevent the gas material, which flows toward the gas outlet (opening at the top of #164, col. 10, line 28), from directly reaching the filter member (#160, col. 10, lines 16-17) while traveling in a straight path from the vaporizing chamber (as shown in Fig. 11).

Claim 8: The vaporizer according to claim 35, wherein a space (outlet chamber #156, col. 10, line 8) is disposed between the filter member (#160, col. 10, lines 16-17) and a shield plate (#150 and #158, together, is a thick plate with bores #152, col. 10, lines 5-8 and line 11) to form a heated gas passage (heated by #158) for delivering the gas material to the gas outlet.

Claim 9: A clearance (between the outmost of the plate of #150 and chamber wall) is formed around the shield plate to allow the vaporizing chamber (space above #150) to communicate with the gas passage (outlet chamber #156, which is the space below #150).

Claim 10: An opening (bore #152, col. 10, line 7) is formed in the shield plate (block #150 and heater #158) to allow the vaporizing chamber (inlet chamber #154, not labeled, col. 10, line 8, the space above #150) to communicate with the gas passage (outlet chamber #156).

Claim 12: The vaporizer according to claim 35, further comprising a control member (#104, not labeled in Fig. 9, col. 8, lines 61-65; Fig. 11 is one instance of the implementation of Fig. 9) configured to control temperature of the second heating portion (it would be obvious to connect to the other heaters in the combined apparatus, including #215 of '487) based on temperature of the shield plate (sensor is adjacent to or in each of the heated element, col. 8, lines 64-65).

Claim 13: The vaporizer according to (sic claim) 12, wherein the temperature of the filter member or the shield plate is set at substantially the same as the temperature of the first heating portion (the shield plate #150 is at substantially the same temperature as the heating portion #158 due to the close proximity).

Applicant's claim requirement "the temperature of the filter member or the shield plate is set at substantially the same as the temperature of the heating portion" is considered intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (*Walter*, 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of

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performing the intended use, then it meets the claim (*In re Casey*, 152 USPQ 235 (CCPA 1967); *In re Otto*, 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02). When the structure recited in the reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent (*In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977); MPEP 2112.01).

Claim 14: A temperature sensor (sensor is adjacent to or in each of the heated element, col. 8, lines 64-65) disposed at the shield plate (block #150 and heater #158), wherein the control member (#104, col. 8, lines 61-65) is configured to control the temperature of the second heating portion (it would be obvious to connect to the other heaters in the combined apparatus, including #215 of '487) based on a signal detected by the sensor.

Claim 15: The vaporizer according to claim 35, further comprising a heater (#158, col. 10, line 11) incorporated in the shield plate (block #150 and heater #158, together, is a thick plate with bores #152, col. 10, lines 5-8 and line 11).

Claim 26: An apparatus (Fig. 9) for performing a semiconductor process on a target substrate, the apparatus comprising: a process chamber (#26, col. 8, line 24) configured to accommodate the target substrate (col. 8, lines 13-14); and a gas supply system (the rest of Fig. 9) configured to supply a process gas into the process chamber, wherein the gas supply system comprises the vaporizer according to claim 35.

Claim 42: The vaporizer according to claim 35, wherein the delivery part further comprises an exhaust passage (#82, drain port, Fig. 7, it is suitably to add to the above combination).

Furthermore, in case applicant argues that #158 is not part of shield plate, Fig. 11 is not drawn to scale. By optimize dimension of various parts and depends on design choices, the line between the spray portion and outlet can obviously cross plate #150.

'487 further teaches the limitations of:

Claim 39: The vaporizer according to claim 35, wherein the second heating portion comprises a heater embedded in the wall of the delivery part (#215 is embedded in the wall).

Claim 40: The vaporizer according to claim 35, wherein the heat transfer member (the not labeled columns between #218 and #203) is formed to protrude from the wall of the delivery part (is protruding from the wall of delivery part).

6. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over '487 and '839, further in view of Zhao et al. (US 20030033978, hereafter '978).

'487 and '839, together, teach all limitations of claim 10, as discussed above. '839 also states multiple filter #160 can be used (col. 10, lines 16-17) and arranged as desired (col. 10, lines 23-24).

'487 and '839, together, do not teach the limitations of:

Claim 11: The opening comprises a slit, which is bent in a thickness direction of the shield plate.

'978 is an analogous art in the field of vaporizer for CVD, particularly in solving the problem of clogged vaporizer with unvaporized precursor ([0008], lines 6-10, similar to the temperature uniformity and particulate formation problem '839 is solving, col. 2, lines 17-22). '978 teaches the use of several tubes with varying porosities with sintered material having circuitous through-passages ([0051], lines 23-28). '978 further provides motivation "a vaporizer with increased surface area which exposes the mixture to a large area of evenly heated surfaces and filters out liquid droplets entrained in the flow" ([0091], lines 2-7).

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have combined '978 with '839. Specifically, to have provided multiple sintered porous plates in Fig. 11 of '839 (instead of just one filter #160) for the purpose to provide increased surface area to filter out liquid droplets, with a reasonable expectation of success.

In the above arrangement, the innermost sintered porous plate would have functioned as the filter while the outer sinter porous plates as "shield plates" to protect the inner plate. The outer sintered porous plates (the shield plates) would have had numerous pores with some slits bent in a thickness direction.

7. Claim 43 is rejected under 35 U.S.C. 103(a) as being unpatentable over '487 and '839, further in view of '239.

'487 and '839, together, teach all limitations of claim 9, as discussed above. '839 teaches a heated block #150 in front of filter, as discussed above.

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'487 and '839, together, do not teach the limitations of:

Claim 43: The vaporizer according to claim 9, wherein the shield plate is disposed to cover the filter member entirely in plane.

'239 is an analogous art in the field of vaporizer for PECVD (Field of the invention). '978 teaches planar shield plate/baffle (#126, Fig. 2) before the gas outlet (#128).

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have combined '239 with '487 and '839. Specifically, to have replaced the shield plate (#150 from '839) with the planar shield plate/baffle of '239, with a reasonable expectation of success. The motivation to replace with planar shield plate would have been suitability. The selection of something based on its known suitability for its intended use has been held to support a *prima facie* case of obviousness. MPEP 2144.07.

8. Claim 18-19, 22-23, and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over '239, further in view of '839.

'239 teaches all limitations of claim 17, as discussed above.

'239 does not teach the limitations of:

Claim 18: The heater is embedded in the plate member.

Claim 19: The plate member has a surface facing the vaporizing chamber and configured to serve as a vaporizing surface for vaporizing the liquid material.

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Claim 22: A temperature control section configured to control temperature of the heater based on temperature of the plate member.

Claim 23: The vaporizer according to claim 17, further comprising a filter member disposed between the gas outlet and the plate member and configured to allow the gas material to pass therethrough.

Claim 45: The vaporizer according to claim 17, further comprising a heating member embedded in the wall.

'839 is an analogous art in the field of vaporizer for PECVD (col. 7, lines 24-30; similar to '239, col. 1, lines 25-26 and abstract), particularly in providing controllable operation and avoiding clogging (col. 3, lines 32-36) solving the problem of clogged vaporizer with unvaporized precursor ([0008], lines 6-10, similar to the temperature uniformity and particulate formation problem '839 is solving, col. 2, lines 17-22). '839 teaches the heated filter, heated flow restriction, etc, (Fig. 9), specifically a block/plate member (#150) with embedded heater (#158) in front of gas outlet to vaporizing liquid material; a filter member (#160, col. 10, lines 16-17) disposed between the gas outlet (opening at the top of #164, col. 10, line 28) and the plate member (block #150, col. 10, line 11) and configured to allow the gas material to pass therethrough (as shown in Fig. 11); and a controller (#104, col. 8, line 63) that control the plate member (#158) based on temperature of the plate member (block #150, col. 10, line 11; in proximity of heater which is adjacent to a sensor, col. 8, lines 62-65).

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have combined '839 with '239. Specifically, to have embedded heater in the plate member to vaporize liquid material, add a filter member, to add heater to the wall surrounding the gas outlet (from teaching of Fig. 9 of '839); and to control the temperature of the heater based on the temperature of the plate member, as taught by '839, for the purpose to provide controllable operation and avoiding clogging (col. 3, lines 32-36).

Allowable Subject Matter

Claim 41 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims and correct the 35 USC 112 rejection discussed above.

Response to Arguments

Applicant's arguments filed 01/02/2009 have been fully considered but they are persuasive.

9. Applicant's amendments overcome previous 35 USC 112 second paragraph rejection, see page 9. However, the amendments also introduce 35 USC 112 first paragraph new matter issues as discussed above.

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10. In regarding to claim 1 rejection based on '487, Applicant's argument is the filter (#216) is not in thermal contact with the wall portion (#203), see the first complete paragraph of page 11.

This argument is found not persuasive.

The examiner maintains that the peripheral portion of the filter (bottom of #216) is fixed to the wall of the delivery part, specifically, the unlabeled bottom wall above the inner o-ring. There are four walls to the delivery part, Applicant's characterization of the wall portion being #203 only is very restrictive and is not what examiner conveyed in the previous office action.

11. Applicants other arguments are not convincing in light of new ground of rejection above.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KEATH T. CHEN whose telephone number is (571)270-1870. The examiner can normally be reached on 6:30AM-3 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on 571-272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/KEATH T CHEN/

Examiner, Art Unit 1792

/Ram N Kackar/

Primary Examiner, Art Unit 1792